5.4. Patented Vegetated Swale

5.4.1. The Howland Swale

General Description

The Howland Swale© is a patented alternative detention structure for stormwater treatment. Collected runoff enters the Howland Swale via a siltation trap lined with large and then small riprap stone (crushed stone) that breaks up the flow velocity and traps larger-sized sediment particles. This trap also acts at a preliminary detention basin as water builds up in the basin prior to overflow on to the next stage.

The second stage, a pretreatment marsh, contains specialized plants to trap and absorb pollutants, increase percolation, and enhance water entrapment. Plant mixes vary, but typically include: cattails, arrow arum, arrowhead, hempweed, woolgrass, tapegrass, blue flag iris, and sphagnum moss.

The third stage is a vegetated storage chamber that provides for runoff control. Water then exits through a vegetated take-off channel, which allows for final washing, velocity reduction, and filtering of water before discharge.

Site Considerations

The Howland Swale© is designed to provide flow control and water quality treatment for stormwater runoff including removal of silts and other contaminants. It is appropriate for use in both commercial and residential development or runoff situations. The Howland Swale© is sized accordingly to the drainage area to be served.

Installation

Howland Swale© installations are custom-designed for site conditions. No pretreatment is required for the Howland Swale. Table 5.9 below shows the Howland Swale component specifications.

Table 5.9. Howland Swale component specifications.

Silt basin	1½' stone for splash point
	½" layer of peastone
	Basin lining of clay or erosion blanket
Pretreatment marsh	Hydric soils
	Cattails planted 2' on centers
	Tearthumb and hempweed rootstock for fringe area
	Soft rush and twig rush edging marsh and at outfall swale
	Arrow arum (seed, cutting, and bulb stock) for marsh entry point
	Tapegrass buffer
	Perennial aster and thistle for marsh slopes and berm sides
Adjustment chamber	4:1 slope planted with winter rye grass planting and erosion matting
	Basin bed may be seeded with sod
Vegetated take-off channel	Base bed 4 – 5'w x 25 – 50'l
	2:1 slope on channel sides with rye grass planting and erosion matting
	Channel base to be contoured with bumpy configuration using 1'w x 0.5'h sod covered clay berms
	Peat-filled capillary mats between berms to be planted with arrow arum, water clover, parrot's feather, and various rushes

Maintenance

Maintenance guidelines can be obtained through contacting the manufacturer.

Aesthetics, Community and Safety

Concerns regarding aesthetics, community support, and safety are highly site specific. For further information refer to Chapter 2, Decision Criteria.

Cost

Howland Swale installations are custom-designed; costs depend on local site conditions and are individually quoted and typically range from $400 to $600. Actual construction costs, which include materials and plantings but do not include pre-construction design work, are approximately $10 per linear foot.

Performance and Verification Ranking

Verification Ranking: 💧💧

With most pollutants, 100% uptake ratios are achieved in the smaller storm events that carry the bulk of pollutants. TSS removals are in the order of 93% to 98%.

Studies:

- *Summary List of Howland Swale Operational Performance*. Environmental Research Corp. GTE Site, Waltham, MA. August 1998.

Installation Contact

There are approximately 300 Howland Swale installations in Southern New England.

Location: Various installations

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Manufacturer

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